Research Note

Studies on phorid flies (Phoridae, Diptera) in Japan

Part IV. Scanning electron microscopic observations of eggs of two *Megaselia*

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(Received : October 27, 1980)

Abstract : Eggs of *Megaselia spiracularis* and *M. scalaris* were examined with the aid of scanning electron microscope. The surface structure of the eggs of both species was observed, and some new findings were made. The micropylar region, which was not noticed so far by light microscope, was recognized as a kind of cactus form situated at the anterior end of the egg. The markings of ventral surface, which were not elucidated clearly by light microscope, were observed in detail in both species.

Phorid myiasis has been caused by eggs and larvae of phorid flies contaminated in food-stuffs (Zumt, 1965). However, so far as we know, there are few detailed reports on morphological informations of egg surface because of the difficulty in observing eggs with conventional light microscope (Schmitz, 1938; Bohart and Gressitt, 1951; Zumt, 1965; Kaneko *et al.*, 1978).

In this paper the authors carried out observations on morphology of the eggs of 2 closely related phorid flies, *Megaselia spiracularis* Schmitz, 1938 and *M. scalaris* (Loew, 1866) with the aid of scanning electron microscope. Measurements are given in mm, and the means in parentheses after the range of variation.

Materials and Methods: Eggs of *Megaselia spiracularis* and *M. scalaris* were obtained from our laboratory colonies. Eggs were killed in water at 80°C after washing in 0.15% synthetic

detergent. Subsequently, some of the specimens were fixed in 70% ethanol and others were fixed in 2% glutaraldehyde. Specimens fixed in ethanol were then dried by xylol (Matsuo and Uemoto, 1975). Other specimens fixed in glutaraldehyde were treated by conductive staining and critical point methods (Watanabe *et al.*, 1975). The dried eggs were fixed with silver paste on SEM specimen stubs and coated with 2 thin layers of gold-carbon in the standard manner. The coated specimens were viewed and photographed with a scanning electron microscope, JSM-U3 of JEOL Inc.

Results: *Megaselia (Aphiochaeta) spiracularis* Schmitz, 1938, Figs. 1-6

Size: Length 0.40-0.60 (0.53), width 0.09-0.16 (0.14), thickness 0.15-0.18 (0.17), boat-shaped with milky-white colour, consisting of upper surface, ventral surface and micropylar region.

Upper surface: Almost flat, covered by 2 kinds of processes; larger ones crateriform, forming 10 regular rows of about 160 processes. Smaller ones granular, irregular in size (Figs. 1-4a). Lateral flanges, being composed of approximately 40 incisor-shaped lobes with small internal papillae. The base of the flanges fixed to the internal chorion by forming pillars, but they are smooth and fix directly to the external chorion (Fig. 4a, b).

Ventral surface: Covered by scalelike structures composed of hexagonal pieces (Figs. 1, 5).

Micropylar region: The micropyle located in the middle of the anterior end, and surrounded by numerous verrucae, being quite distinct from other parts (Figs. 5, 6).

Megaselia (Megaselia) scalaris (Loew, 1866), Figs. 7-12

Size: Length 0.55-0.65 (0.60), width 0.08-0.11 (0.10), thickness 0.14-0.20 (0.17), boat-shaped with silverly-white colour, consisting of upper surface, ventral surface and micropylar region.

Upper surface: Slightly convex, margined by the lateral flanges of approximately 28 rectangular lobes (Fig. 7). The surface covered by 3 kinds of processes. Largest ones of them obliquecone-shaped, forming 5 regular rows of about 75 processes. Middle processes disc-shaped. Smallest ones granular (Figs. 8-10b).

Ventral surface: Sculptured with a reticulation of regular hexagonal markings. Inter-hexagonal areas are flat (Figs. 7, 11).

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Figs. 1-6

Figs. 7-12

Micropylar region: Flattened, micropyle surrounded by minute rod-shaped processes.

Discussion: *Megaselia spiracularis* is closely related to *M. scalaris* in appearance by light microscope. However, as shown in the scanning electron micrographs (Figs. 1-12), they are clearly distinguished from each other by numbers of the flanges on lateral margin, by the processes on the upper chorion surface, by the markings of ventral surface, and by the shape of processes on micropylar region.

Lateral flange: *M. spiracularis* has elongated concisor shaped lobes, while *M. scalaris* has rectangular lobes, and so *M. spiracularis* has more lobes.

Processes covering the upper chorion surface: Particularly regarding largest processes, *M. spiracularis* has about 160 crateriform ones in 10 rows, on the other hand about 75 oblique-cone-shaped ones of 5 rows in *M. scalaris*.

Ventral markings: *M. spiracularis* is covered by scalelike structures, but *M. scalaris* with a swollen border on the hexagonal margin.

Micropylar region: *M. spiracularis* is domed with verrucae, while *M. scalaris* flattened with rod-shaped processes.

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摘 要

日本産ノミバエに関する研究

第4報 走査電子顕微鏡による *Megaselia* 属
2種の卵微細構造について

オオキモンノミバエ *Megaselia spiracularis* とクサビノミバエ *M. scalaris* の卵の表面構造を走査電子顕微鏡で観察した。とくに精孔部は、光学顕微鏡では認められないが、その特徴が明らかとなった。このほか、光顕的には観察が不可能であった背面の各種突起の微細構造および腹面の六角形紋理の形態的差異が認められた。

Figs. 1-6 Scanning electron micrographs of the egg of *Megaselia spiracularis*

Fig. 1 A low magnification of egg. $\times 154$

Fig. 2 Processes on upper surface. $\times 755$

Fig. 3 A higher magnification of processes covering upper surface. $\times 2,190$

Fig. 4a An external view of lobes. $\times 616$

Fig. 4b Rod-like processes covering the inside of lobes. $\times 4,620$

Fig. 5 A lateral view of micropylar region. $\times 770$

Fig. 6 A top view of micropylar region. $\times 1,540$

Figs. 7-12 Scanning electron micrographs of the egg of *Megaselia scalaris*

Fig. 7 A low magnification of egg. $\times 154$

Fig. 8 Processes on upper surface. $\times 770$

Fig. 9 A higher magnification of a lateral view of processes. $\times 19,040$

Fig. 10a An external view of lobes. $\times 1,510$

Fig. 10b Small granular processes covering the inside of lobes. $\times 9,240$

Fig. 11 A lateral view of micropylar region. $\times 755$

Fig. 12 A top view of micropylar region. $\times 755$